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## Fe2O3-silicone adhesive composite based humidity sensors

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### OPTOELECTRONICS AND ADVANCED MATERIALS-RAPID COMMUNICATIONS

Volume: 7 Issue: 11-12 Pages: 861-865

Published: NOV-DEC 2013

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### Abstract

This study presents the electrical properties of Fe<sub>2</sub>O<sub>3</sub> based humidity sensors fabricated by the use of Fe<sub>2</sub>O<sub>3</sub> powder and silicone liquid adhesive. For the fabrication of Cu/Fe<sub>2</sub>O<sub>3</sub>-Adhesive/Cu sensors, Fe<sub>2</sub>O<sub>3</sub> powder was mixed in a 50 wt. % silicone liquid adhesive and then deposited between copper electrodes. These preliminary deposited Cu electrodes having 40 μm gap between them were deposited on glass substrates by vacuum thermal evaporation. The capacitance and dissipation of the sensors were measured under the effect of relative humidity (RH) and the resistance was calculated. It was found that with increase in humidity from 54%-94%, the resistance of the sensors decreases by 6375 times and capacitance increases by 5714 times respectively. The resistance and the capacitance-humidity relationships show significant change in the range of 54%-80% RH and 80%-94% RH respectively. The humidity dependent properties of the sensor make it attractive to be use in capacitive and resistive type humidity sensors. Thus it can be used in the humidity meters for environmental monitoring and assessment purposes.

### Keywords

**Author Keywords:** Iron oxide; Silicon adhesive; Composite; Humidity sensor

**KeyWords Plus:** SENSING PROPERTIES; THIN-FILMS; OXIDE; NANOCOMPOSITES; ALPHA-FE<sub>2</sub>O<sub>3</sub>; POLYMERS; GAS

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### Publisher

NATL INST OPTOELECTRONICS, 1 ATOMISTILOR ST, PO BOX MG-5, BUCHAREST-MAGURELE 76900, ROMANIA

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**Research Areas:** Materials Science; Optics

**Web of Science Categories:** Materials Science, Multidisciplinary; Optics

**Document Information**

**Document Type:** Article

**Language:** English

**Accession Number:** WOS:000328253100011

**ISSN:** 1842-6573

**eISSN:** 2065-3824

**Journal Information**

**Impact Factor:** [Journal Citation Reports](#)

**Other Information**

**IDS Number:** 269PF

**Cited References in Web of Science Core Collection:** 38

**Times Cited in Web of Science Core Collection:** 4

